

Course Syllabus

1. Class Information

- **Class Title:** Planning Procedure of Naval Architecture and Ocean Engineering
- **Class Number:** 414.234A(3 Credits)
- **Semester:** Fall, 2013
- **Level of Course:** Undergraduate / Sophomore
- **Class Time:** Tue. 14:00-15:50 p.m., Thu. 14:00-15:50 p.m.
- **Location:** Room 106, Bldg. 34
- **Instructor:** Prof. Myung-II Roh
Office: Room 205, Bldg. 34
E-mail: miroh@snu.ac.kr
Phone: (02)-880-7328
Office Hours: Available before school and after school by appointment.
- **Teaching assistants:** **Ki-Su Kim**
E-Mail: kisu2511@snu.ac.kr
Office: Room 312, Bldg. 34
Phone: (02)-880-8378
- **Language of Instruction:** English

※ **Announcement:** Please note that all lectures, assignments, exams, and term projects for this course are in English.

2. Course Topics and Description

The course deals with ‘Ship Stability in Ocean Environment’

- 1) Based on the fluid mechanics, position, and orientation of a ship in calm water such as immersion, heel and trim are introduced.
- 2) Then the students learn how to evaluate the required intact and damage stability of IMO regulations.
- 3) Also students have to work in team, consisting of 3 students, on a term project to calculate the properties of a floating body, such as its volume and water plane area. The floating body can have various types of complex bodies – e.g., barge type or semi-submersible type. Therefore, a polyhedron that is a solid bounded by planar faces, for which triangle meshes are commonly used, is generated by discretizing the surface model of the hull form. The surface area, volume, moment, and moment of inertia of the surface model, which is generally used to calculate the hydrostatic properties, can be calculated from the polyhedron.

Term Project: Programming for the calculation of hydrostatic properties such as displacement volume, KB, LCB, BM_T , BM_L , water plane area, LCF, wetted surface area for a ship or an offshore structure.

3. Textbook and Reference

(1) Textbook

- Roh, Myung-II, Ship Stability, Lecture Note for Planning Procedure of Naval Architecture and Ocean Engineering, Seoul National University, Fall, 2013

(2) Reference

- 대한조선학회, “선박계산”, 텍스트북스, 2012.11.
- Lee, Kyu-Yeul, Roh, Myung-II, Lecture Note for “Innovative Ship Design”, Seoul National University, Fall, 2013
- Letcher, John S., “The Principles of Naval Architecture: The Geometry of Ships”, SNAME, 2009

Moore, Colin S., “The Principles of Naval Architecture: Intact Stability”, SNAME, 2010

4. Grade Computation

Weighted system is as follows:

- Two Exams: 60%
- Term Project : 30%
- Attendance: 10%

In case of an excused absence, the student must make-up any missed test, quiz or homework the following day during a free period, before or after school. Unexcused absences will result in a zero.

5. Website: <http://etl.snu.ac.kr>

Most assignments, instructions and notice for supplementary lecture will be made only on the website, so check it frequently.

6. Class Expectation

- All lectures, assignments, exams and term projects for this course are presented in English
- Late work will be not accepted
- Show respect to others and their property
- Come prepared to class
- Required to make appointments to see instructor during office hours. Send email for an appointment at least one day in advance

7. Exam Schedule

	Mid Exam (30%)	Final Exam (30%)
Date	October 24 th , 2013 (Thursday), 14:00~15:50	December 12 th , 2013 (Thursday), 14:00~15:50
Range of Exam	<ul style="list-style-type: none"> - Concept of restoring force and moment - Transverse stability - Longitudinal stability - Free surface effect - Numerical integration method in naval architecture 	<ul style="list-style-type: none"> - Surface area, volume, moment, and moment of inertia of the polyhedron model - Calculation of hydrostatic properties - Deterministic damage stability - Determination of position and orientation of a ship or an offshore platform by solving the nonlinear coupled equation for immersion, trim, and heel - Probabilistic damage stability

8. Course Schedule

Week	Parts	Regular Lecture				Term Project
		Tuesday		Thursday		
		Date	Time : 14:00-15:50	Date	Time : 14:00-15:50	
1	Ship Stability in Calm Water	09/03	Introduction	09/05	Hydrostatic Pressure, and Buoyant Force on a Floating Body	Programming Assignments: According to the Notice
2		09/10	Restoring Force and Moment	09/12	Transverse Stability (1)	
3		09/17	Transverse Stability (2)	09/19	Holiday	
4		09/24	Transverse Stability (3)	09/26	Transverse Stability (4)	
5		10/01	Free Surface Effect	10/03	Holiday	
6		10/08	Stability Criteria	10/10	Longitudinal Stability (1)	
7		10/15	Longitudinal Stability (2)	10/17	Longitudinal Stability (3)	
8		10/22	Numerical Integration Method in Naval Architecture	10/24	Mid Exam	
9		10/29	Surface area, Volume, Moment, and Moment of Inertia of Polyhedron Model (1)	10/31	Surface area, Volume, Moment, and Moment of Inertia of Polyhedron Model (2)	Term Project - Due date: Dec, 1(Sun), 23:00
10		11/05	Hydrostatic Properties	11/07	Deterministic Damage Stability (1)	
11		11/12	Deterministic Damage Stability (2)	11/14	Deterministic Damage Stability (3)	
12		11/19	Determination of Position and Orientation of an Offshore Platform (1)	11/21	Determination of Position and Orientation of an Offshore Platform (2)	
13	Ship Stability in Waves	11/26	Probabilistic Damage Stability (1)	11/28	Probabilistic Damage Stability (2)	
14		12/03	Probabilistic Damage Stability (3)	12/05	Probabilistic Damage Stability (4)	
15		12/10	Probabilistic Damage Stability (5)	12/12	Final Exam	